Automated Academic Planning System

Pranay Mohapatra

109CS0449

Department of Computer Science and Engineering
National Institute of Technology Rourkela
Rourkela-769 008, Odisha, India

Automated Academic Planning System

Project submitted in

June 2013

to the Department of

Computer Science and Engineering

of

National Institute of Technology Rourkela

in partial fulfillment of the requirements

for the degree of

Bachelor of Technology

in

Computer Science and Engineering

by

Pranay Mohapatra

[Roll: 109CS0449]

under the guidance of

Professor S K Jena

Department of Computer Science and Engineering
National Institute of Technology Rourkela
Rourkela-769 008, Odisha, India

Department of Computer Science and Engineering
National Institute of Technology Rourkela
Rourkela-769 008, Odisha, India.

Jun 10, 2013

Certificate

This is to certify that the work in the thesis entitled ***Automated Academic Planning System*** by ***Pranay Mohapatra 109CS0449*** is a record of an original research work carried out under my supervision and guidance in partial fulfillment of the requirements for the award of the degree of Bachelor of Technology in Computer Science and Engineering. Neither this thesis nor any part of it has been submitted for any degree or academic award elsewhere.

Dr. S K Jena
Professor
Department of CSE, NIT Rourkela

Acknowledgment

I take this opportunity to express my profound gratitude and deepest regards to my guide Dr. S. K. Jena for his exemplary guidance, monitoring and constant encouragement throughout the course of this project. The blessings, help and guidance given by him time to time shall carry me a long way in the journey of life on which I am about to embark.

I am highly obliged to all the professors of the Department of Computer Science and Engineering, NIT Rourkela for instilling in me the basic knowledge about the field that greatly benefitted me while carrying out the project and achieving my goal.

Also, I am highly indebted to the Department of Computer Science and Engineering for teaching me all that I know today.

Lastly, I am grateful to my friends Prateek,Sourav,Chinmay,Vikash,Shivam and the whole class of CSE-2013 for their relentless support in augmenting the value of work; my family, for being considerate and appreciative throughout; and The Almighty, for everything.

Pranay Mohapatra

109CS0449

"Now faith is the substance of things hoped for, the evidence of things not seen.."

-The Bible

Abstract

Planning and Scheduling of classes in an institute is of pivotal importance. Classes which have to be rescheduled must be immediately notified to the students so that they do not miss the classes and later blame the authorities for not notifying them.Same is the case for classes which are cancelled. Assignments given by faculties must be immediately relayed to the students since the students have to plan their everyday schedule according to the academic workload.

Many a times classes are cancelled or rescheduled on a short notice or extra classes are scheduled prior to any information. This leads to students missing a number of classes or wasting their time and energy to attend a class which was already cancelled. Assignments on the other hand fail to get submitted on time due to misinformation by the intermediaries.

The general method used to relay such information is taking the help of the class representative of the class, who either sends SMS or emails to every student,which have an history of failing. All the various information about the timing of classes cancelled or rescheduled, submission of assignments and other important notices is handled by one human which increases the chances of failure from time to time.If the class representative is not available then the problem aggravates to a higher level.

In this project, we have tried to replace the manual labour involved in the aforementioned issues and created an automated system which eliminates the work of the class representative to some extent.

Also a scheduler is made for students to schedule their daily activities along with the classes so that any change in the academic schedule or any pending assignments or other issues will be reflected and they can plan their day accordingly.

Contents

List of Figures

Chapter 1

Introduction

1.1 Need to Relay Class and Assignment Information

Scheduling of classes in an institute is of utmost importance.Classes which have to be rescheduled must be immediately notified to the students so that they do not miss the classes. In most cases, authorities are blamed for not notifying the students. Same is the case for classes which are cancelled. Assignments given by faculties must be immediately relayed to the students since the students have to plan their everyday schedule according to the academic workload. Many a times classes are cancelled or rescheduled on a short notice or extra classes are scheduled prior to any information. This leads to students missing a number of classes or wasting their time and energy to attend a class which was already cancelled. Assignments on the other hand fail to get submitted on time due to misinformation by the intermediaries.

1.1.1 Common Methods of Relaying Information

The general method used to relay such information is taking the help of the class representative of the class [Fig1.1], who either sends SMS or emails to every student,which have an history of failing. All the various information about the timing of classes cancelled or rescheduled, submission of assignments and other important notices is handled by one human which increases the chances of failure from time to time.If the class representative is not available then the problem aggravates to a higher level.

- **Problem 1: SMS** The SMS services tend to fail from time to time. Moreover the

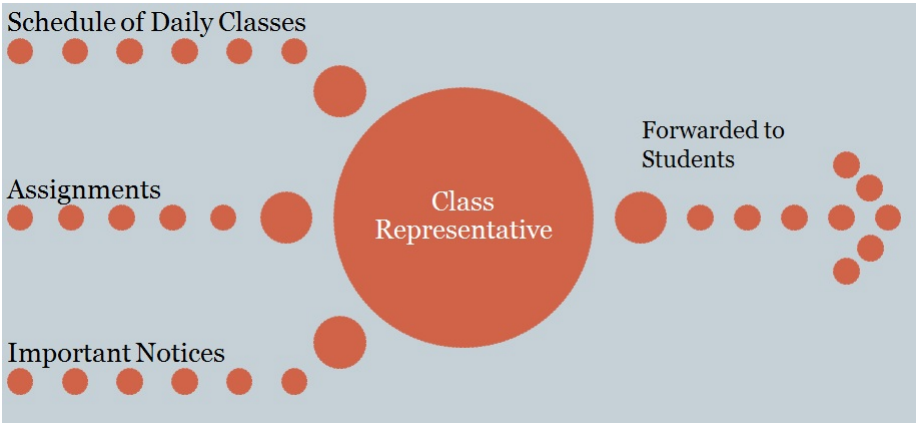


Figure 1.1: Basic Flow of Information

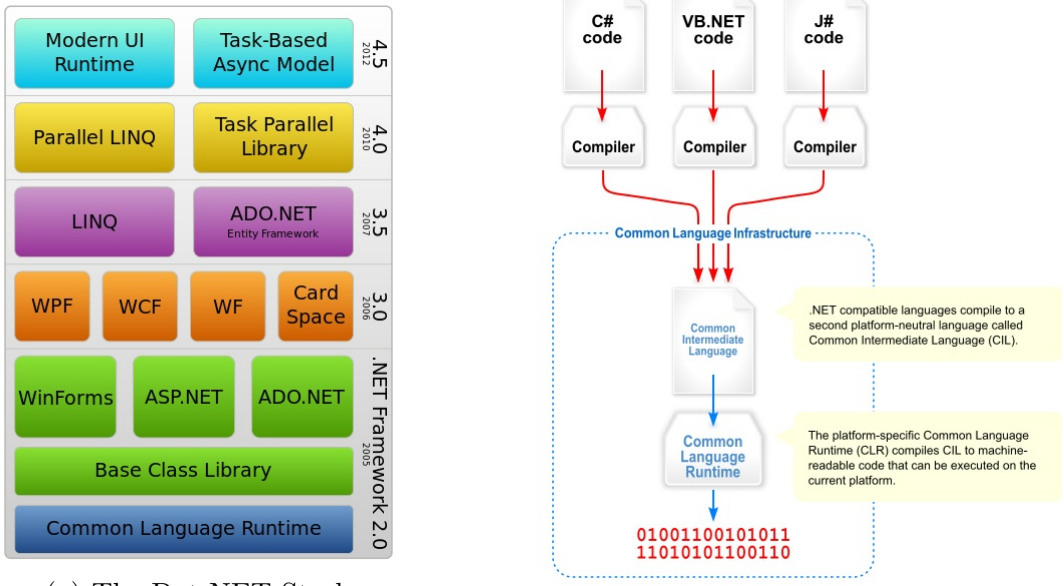
cost of SMS has to be bore by the class representative

- **Problem 2: eMail** eMail requires constant internet connection which may not be available always.

- **Problem 3: Absence of Class Representative** Since the cr is the sole person for passing the important notices between the faculty and students, his/her absence will further aggravate the problem

1.1.2 Role of the Automated System

In this automated system, the role of the cr is minimised to a safe level. The application has all the essential features like 'schedule class', 'cancel class', 'give assignments' for the faculty. The application focusses on helping the students plan their daily routine based on their academic timetable which includes the everyday class schedules and also the pending assignments. The student can schedule his or her daily activities and the system will automatically and optimally schedule the extra classes and assignments within the free time of the student. After optimally scheduling the everyday academic work, it will notify or warn the student for any assignments which are to submitted in the next few days, notify about the classes which were cancelled in a short notice, warn for any shortage of attendance and likewise. All of this was done using Visual C#.NET and SQL Server 2008 as the backend.



(a) The Dot NET Stack

(b) The Common Language Runtime

Figure 1.2: The .NET FrameWork

1.1.3 Technologies used for Implementation

What is .NET

The .NET Framework [Fig1.2] (pronounced dot net) is a software framework developed by Microsoft that runs primarily on Microsoft Windows. It includes a large library and provides language interoperability (each language can use code written in other languages) across several programming languages.Programs written for the .NET Framework execute in a software environment (as contrasted to hardware environment), known as the Common Language Runtime (CLR), an application virtual machine that provides services such as security, memory management, and exception handling. The class library and the CLR together constitute the .NET Framework.

Why .NET

Microsoft .NET platform provides the following programming features which aid in the making of a 3-tier client server application software.

- **Interoperability** : Because computer systems commonly require interaction between newer and older applications, the .NET Framework provides means

to access functionality implemented in newer and older programs that execute outside the .NET environment. Access to COM components is provided in the System.Runtime.InteropServices and System.EnterpriseServices namespaces of the framework; access to other functionality is achieved using the P Invoke feature.

- **Common Language Runtime engine** : The Common Language Runtime (CLR) serves as the execution engine of the .NET Framework. All .NET programs execute under the supervision of the CLR, guaranteeing certain properties and behaviors in the areas of memory management, security, and exception handling.Programs written for the .NET Framework execute in a software environment (as contrasted to hardware environment).

- **Base Class Library** : The Base Class Library,is a library of functionality available to all languages using the .NET Framework. The BCL provides classes that encapsulate a number of common functions, including file reading and writing, graphic rendering, database interaction, XML document manipulation, and so on.

- **Simplified deployment** : The .NET Framework includes design features and tools which help manage the installation of computer software to ensure it does not interfere with previously installed software, and it conforms to security requirements.

- **Portability** : The .NET framework is engineered to be platform independent , with various cross platform implementations being available for other operating systems.The Common Language Infrastructure(which includes core class libraries, CTS and CIL), the C# language and the C++/CLI are available as official standards.

What is C#

C# is a multi-paradigm programming language encompassing strong typing, imperative, declarative, functional, procedural, generic, object-oriented (class-based), and component-oriented programming disciplines. It was developed by Microsoft within its

.NET initiative and later approved as a standard by Ecma and ISO . C# is one of the programming languages designed for the Common Language Infrastructure.

Why C#

- The C# language is a simple, modern, general-purpose, object-oriented programming language.
- Since software robustness, durability, and programmer productivity are important, therefore C# and its implementations provide support for software engineering principles such as strong type checking, array bounds checking, detection of attempts to use uninitialized variables, and automatic garbage collection.
- C# was designed for using in the development of software components to be deployed in a distributed environment.
- C# strongly resembles C and C++ and also included a majority of their concepts.Hence it helps in programmer portability

Why SQL Server

Microsoft SQL Server is a relational database management system developed by Microsoft,with T-SQL and ANSI SQL being its primary query languages. As a database, it is a software product whose primary function is to store and retrieve data as requested by other software applications, be it those on the same computer or those running on another computer across a network (including the Internet).
The protocol layer implements the external interface to SQL Server. All operations that can be invoked on SQL Server are communicated to it via a Microsoft-defined format, called Tabular Data Stream (TDS). TDS is an application layer protocol, used to transfer data between a database server and a client.
SQL Server supports different data types, including primary types such as Integer, Float, Decimal, Char (including character strings), Varchar (variable length character strings), binary (for unstructured blobs of data), Text (for textual data) among others
SQL CLR

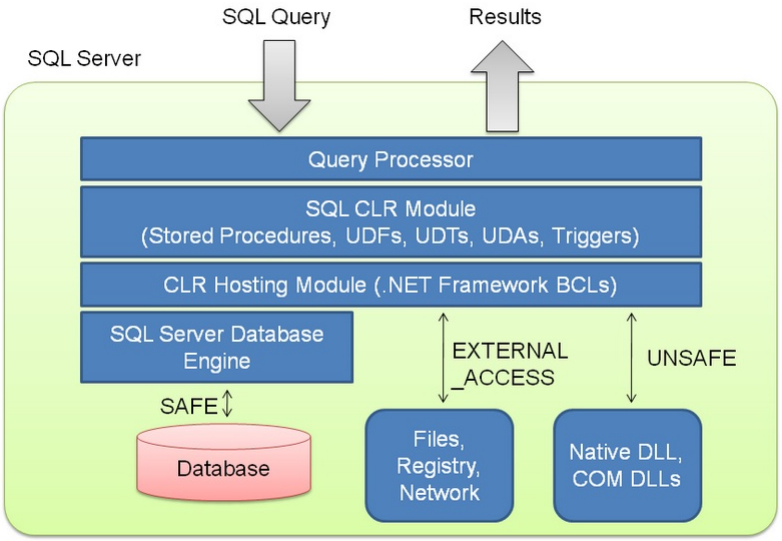


Figure 1.3: SQL CLR Architecture

Microsoft SQL Server 2005 and above integrates with the .NET Framework via a component named SQL CLR [Fig1.3] ("Common Language Runtime"). SQL Server itself hosts the .NET Framework runtime,unlike most other applications that use .NET Framework. Memory, threading and resource management requirements of .NET Framework are satisfied by SQLOS itself and not by the underlying Windows operating system. SQLOS provides deadlock detection and resolution services for .NET code as well. With SQL CLR, stored procedures and triggers can be written in any managed .NET language, including C# and VB.NET. Managed code can also be used to define UDT's (user defined types), which can persist in the database. Managed code is compiled to CLI assemblies and after being verified for type safety, registered at the database. After that, they can be invoked like any other procedure.Data stored in SQL server database can be accessed by writing code for the SQL CLR which uses the ADO.NET API's.

1.2 Motivation

In a general scenario,all the responsibility for passing the information about changed class schedules and assignments to be submitted and other important academic information

is shouldered by one individual which increases the chances of error. Many a times intermediaries are involved since students reside in different hostels or outside the campus. The failure of Internet and SMS services are the other threats involved.
Since a lot of pressure is put on one individual, his/her curricular and co-curricular progress may be hampered. Students generally do not remember their daily class schedule and most of the time, the cr regularly sends notifications to the students.Students often fail to submit the assignments on time because they do not get timely reminders.
Few such automated systems exists like Moodle and Google Docs, but they are not intuitive and easy to use.Some features require a persistent internet connection.
The design of such an automated system will not only automate the duties of the cr but also make the process faster. Since the human involvement will be minimised, we hope that the chances of error will be minimised.We also hope that The rate of missing classes will decrease and the rate of task submission in the proper deadline will increase since the students will get automatic reminders about all academic plans.Also, since this application can be hosted on the local network, the students will not have to depend on the constant availability of internet.

1.3 Objective and Scope of the Work

The project is carried out with the following objectives:

- Design of a intuitive electronic system which will eliminate the human involvement
- Implementation of the design into an user friendly and intuitive software for both the faculties and students.
- Design of an intelligent module which will help students schedule important tasks like assignments and help them plan their daily schedule accordingly

1.4 Outline of Thesis

The thesis consist of three chapters following this chapter:

Chapter 2: General Description of the System

In this chapter we discuss about the General constraints, Product Prospective and User characteristics etc.

Chapter 3: Requirement analysis and specification

In this chapter we discuss about the functional requirements of the system and present the SRS model of the system.

Chapter 4: Design

In this chapter we discuss the different Design models. The Function Oriented design approach focuses on the functions of the system,The functionalities are represented with the help of DFDs. The object oriented design approach focuses on the ER model of the system..

Chapter 5: UML modelling

In this chapter, we help the reader visualize the design with the help of UML. UML is a modelling language that is used to specify, draw, visualize and document the parts of the software. Use case diagrams are the diagrammatic representation depicting users interactions with the system. and other diagrams are drawn in the same reference such as Class diagram, activity diagram and sequence diagram.

Chapter 6: Implementation

in this chapter, the outlines the three tier architecture of the application developed are shown. The Client side is the windows forms application interface that is accessed by the user. SQL Server 2008 server acts as the back end.

Chapter 7: Graphical User Interface

In this chapter we describe the different user interfaces of the applications and the forms shown to the user.

Chapter 8: Conclusion and Future Work In this chapter we present the final concluding points and show the areas in which additional work for the enhancement of the system can be done in the future.

Chapter 2

General Description of the System

2.1 Introduction

The automated planning system's 'professor' module provides ease in the working, managing of the the day to day hassles of cancelling or rescheduling of classes, giving assignments or warning students to submit assignments in an easy way through an intuitive interface that makes it easy for every faculty to utilize it fully and is virtually maintenance free.

The 'student' module provides ease of access to daily class schedules, pending assignments and attendance statistics. It also provides an intelligent way of helping students schedule their assignments and regular activities between their busy daily schedule.

The subsection 2.2 explains the product perspective, 2.3 explains the functions of the product. Section 2.4 explains the type of user and characteristics. Section 2.5 explains the constraints and requirements.

2.2 Product Perspective

Our automated planning system simplifies the daily hassle of conveying the modified schedule of classes for each day.Generally almost everyday, classes are cancelled or rescheduled and its a problem on both the faculty and student's to get the correct information.The system provides a very easy way to cancel or reschedule classes and it seamlessly conveys this information to the students.Also this system has a intuitive feature which helps the faculty issue assignments to the students and provide them with a URL to the list of questions or problem statement. The students can check their daily

schedule with this system and get warnings whenever there is a change of schedule.The system tightly binds the needs of the faculty to conveys important information and the needs of the student who requires the correct information as soon as possible to plan his ahead his daily schedule.

2.3 User Characteristics

2.3.1 Faculty

- The faculty logs in into the system to access the list of functionalities offered by the system
- The faculty can schedule classes at the beginning of the semester, which is fixed by the academic section He can also reschedule classes as per his and the other professors convenience.
- The faculty can cancel classes as per his needs. He gets the option to cancel classes one by one, or cancel or classes for the day at a go or classes for multiple days if he has to go on a leave.
- The faculty can give assignments to the students. The system warns him if the work load of the students is in a permissible limit. It is then upto the discretion of the faculty if he wants to give the assignment or extra work.

2.3.2 Student

- The student logs in into the system with the roll no and password provided to him by the institute which he uses to log into cyberroam upon which he can access the list of functionalities.
- The student can check his daily schedule and schedule his daily activities into the free time of the day. Any classes cancelled or rescheduled is immediately reflected in his schedule. He may then change his daily activity accordingly.Also, the student doesn't have to worry about scheduling assignments. That is automatically intelligently done by the system after asking the student to choose one of the best time slots available.

- The student can check for assignments either for the day or select any date. The system shows all the assignments which were either given on that date or have to be submitted on that date. The system shows the link to the assignment problem statement, and upon clicking the link, the default browser opens the link.

2.4 General Constraints

The general constraints of this system are of two types

1. Hardware Constraints
2. Software Constraints

The Hardware constraints are that the system needs any system which can run Windows Os. The software constraints are as follows

2.4.1 Server Side

Database Server : SQL Server 2008 or higher

Platform : Microsoft .NET 3.5 or higher

2.4.2 Client Side

Platform : Microsoft .NET 3.5 or higher

Front End : Visual C#

Chapter 3

Requirement Analysis and Specification

The Application developed follows the following steps of SDLC. Under which the SRS model developed for the system is as listed below
The SRS model Contains

- Functional Requirements.
- Non-Functional requirements

3.1 Functional Requirements of the System

The functional requirements part discuss the functional behavior that should be possessed by the system. Each requirement maps to a high level function (fi) that transforms the given set of input data (ii) into output data (oi) [1]
Different functional requirements possessed by the system are:-
R1 : Login
Description : The faculty or student will login into the application with the given user ID and ssword by the institute. If the user ID and password is correct, user will be displayed with the respective options for either the professor or student else error message will be displayed.
Input: UserID and Password
Output : Display the list of options available

3.1.1 Professor Module

R2:Schedule or Reschedule Classes

After login, the faculty can select this option to reschedule or schedule the classes. The system automatically fetches the list of subjects taught by the faculty.He is shown the classes he takes and is given two options, either to schedule for a random selected date or a day in the week.

Input: Select the displayed option for Scheduling or Rescheduling Classes.

Output: List of subjects taught are shown and options are shown the classes he takes and is given two options, either to schedule for a random selected date or a day in the week.

R2.1: Schedule Classes By Day

The faculty is given the option to schedule classes by day. The day selected is the next calendar date of the week.The facutly selects the subject, the day and the schedule and the system schedules the class based on if the timeslot selected is occupied or not

Input: The course to be scheduled, the day in which to be scheduled and the time slot.

Output: Message Box showing successful scheduling of class.

R 2.2: Schedule Classes By Date

The faculty can also schedule the classes for a random date provide an entry for that date already exists i.e the schedule has been already populated from the fixed schedule by the system.The system populates the next 14 dates from the current day automatically.If the date doesn't have an entry then an entry under that date will be created but the faculty has to manually fill in all the other classes along with the class to rescheduled.

Input: The course to be scheduled, the date and timeslot **Output:**Message Box showing successful scheduling.

R 3: Cancel Classes

The user can cancel classes either one by one, or cancel multiple glasses in a go.The courses are automatically displayed along with the class schedule.

Input: Select option to either cancel classes one by one, or cancel classes by date or cancel multiple classes or cancel all classes for the current date.

Output: The controls for each option is displayed.

R 3.1:Cancel Classes one by one

The user can cancel classes one by one for all days in the current calendar week.The user is prompted all the subjects that he teaches and existing schedule.Once classes are cancelled, the CourseID's of the cancelled classes are reflected in the Status field of that day.Error is shown in case if there are no classes for the selected subject in that day.

Input: Select subject code and day.

Output: Successful cancellation of class or error message.

R 3.2: Cancel Class by Date

The uses can cancel the classes for any random date provided the subject selected has already been scheduled on that day else error message is shown.

Input: Select subject code and date.

Output: Successful cancellation of class or error message.

R 3.3: Cancel all classes for today

This option is useful for the faculty if he is taking the current day off.At the click of the button, all of is classes for the current date are cancelled.

Input: Click on the button.

Output: All classes are cancelled and message is shown.

R 3.4: Cancel Classes for Multiple Days

This option can be used by faculty to cancel multiple instances of a class in one go.

Input: Select subject code and number days starting from current date for which class is to be cancelled.

Output: Class is cancelled else error message is shown.

R 4: Give Assignments

The user selects the subject code, and inputs all details of the assignment to be given. The system automatically calculates the workload of students and shows a warning if it exceeds limits.Then it is upto the faculty's discretion.

3.1.2 Student Module

R 5 : Schedule Daily Activity

The student can schedule all his daily activities in this form. All the warnings about the classes cancelled or new assignments and other important notification as continuously displayed here.

Input: User selection of the Schedule activity button.

Output: Prompt to schedule activities.

R 6: Check Assignments

Here the user can check his assignments either by day or date.

Input: Select the Check Assignments option.

Output: Form showing the different options to check assignments.

R 6.1: Check assignments for today

This option helps the user to see all the assignments which were either uploaded today or which have to be submitted today.If there are no assignments for the courses he has registered then the system shows appropriate message.Upon clicking the link to the assignment problem questions, the default browser opens the page.

Input: Select the Check Assignments for today option.

Output: Shows all the assignments or displays appropriate error message.

R 6.2: Check assignments for any date

This option shows all the assignments which have to be submitted on the selected date or were uploaded on that date. Proper error message is shown if assignments are not found.

Input: Select the date and select the check option.

Output: All the assignments are displayed else error message is shown.

R 7: Check Attendance

This option will help the user to keep track of his attendance. If a gradeback or debar is imminent then he will be given proper warnings.

Input: Select subject and select the check option.

Output: The attendance for that subject will be shown.

Chapter 4

Design

The design phase emphasizes on the transformation of user requirements as defined in the SRS document, into a form that is suitable for coding.
The design phase can be broadly classified in two levels.

- Preliminary or high level design.
- Detailed design.

The preliminary design can be further divided into two sub categories.

- Function Oriented Software Design.
- Object Oriented Software Design.

4.1 Function Oriented Software Design

This design model can be represented by drawing the DFDs (Data Flow Diagrams) for the given SRS document.
A data flow diagram is a graphical representation of the data flow through an information system which is used to model the process aspects of the system. DFD is the preliminary step used to create an overview of the system. DFD is used for structured design.[1]

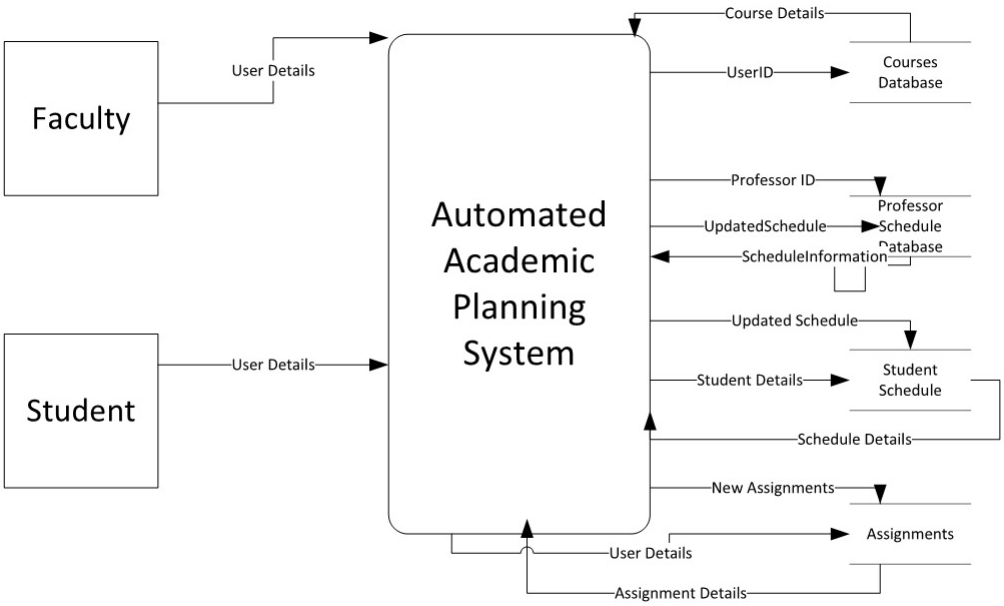


Figure 4.1: Context Diagram

4.1.1 Context diagram

A context diagram is a structured graphical tool used for identifying the functional areas and the processes which are performed within and between the system and outside the system. Context diagram supports a data-oriented approach for designing system. It helps in investigating the output and the process requirement of the system. It helps in defining the boundaries of the proposed system. The symbols used in the context diagrams are for external entities, data storage and data flows and process.
Here in the above context diagram [4.1], we represent our automated planning system which has two external entities i.e. user of the system namely Faculty and Student and the data flowing in and out of the system is the course details,schedule details etc.

4.1.2 Level 1 Diagram

The context-level DFD is then exploded to produce a Level 1 DFD which models the details of the system. The Level 1 DFD shows how the system is divided into sub-systems (processes), and how each processes deals with one or more of the data flows to or from an external entity, and how the processes together provide all of the functionality of the system. The level 1 DFD also identifies the internal data stores which must be there for

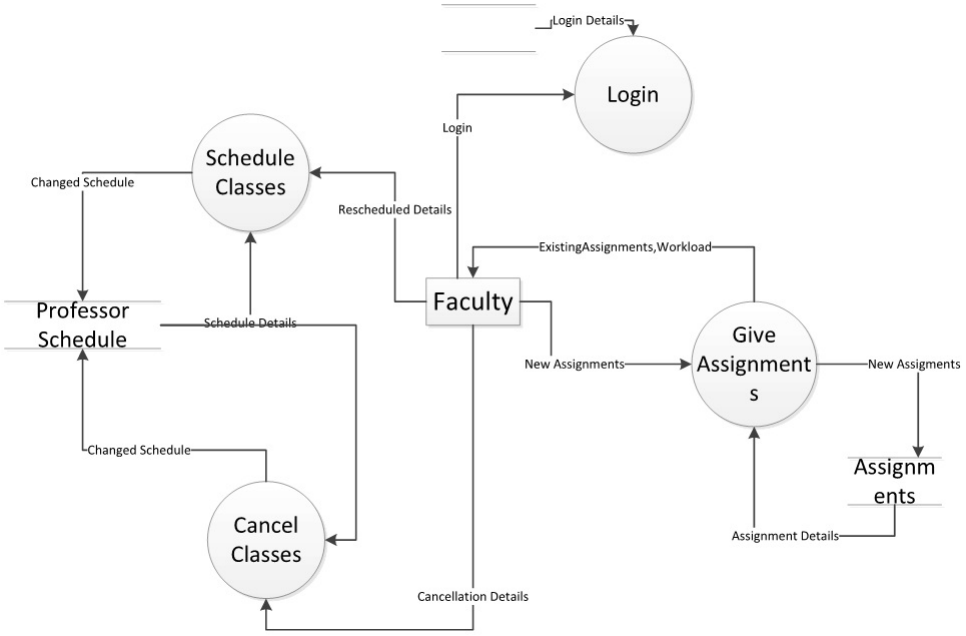


Figure 4.2: DFD Level 1:Professor Module

the system to do its job, and shows the data flow between the various parts of the system.

Professor Module

In the DFD Level 1 Diagram above [4.2], the Context diagram has been exploded to show the 3 processes of the Professor Module which are namely Schedule Classes, Cancel Classes, Give Assignments , and one generic module named Login.Each process is accessed by the faculty and there are data stores which are namely ProfessorSchedule, User Details and Assignments.

Student Module

In the DFD Level 1 Diagram below [4.3], the context diagram has been exploded to show the 3 processes of the Student Module.
The processes are namely Schedule Activity, Check Assignments, Check Attendance and one generic process Login. Each process is accessed by the student. The data stores are namely Student Schedule,Assignments and User Details.

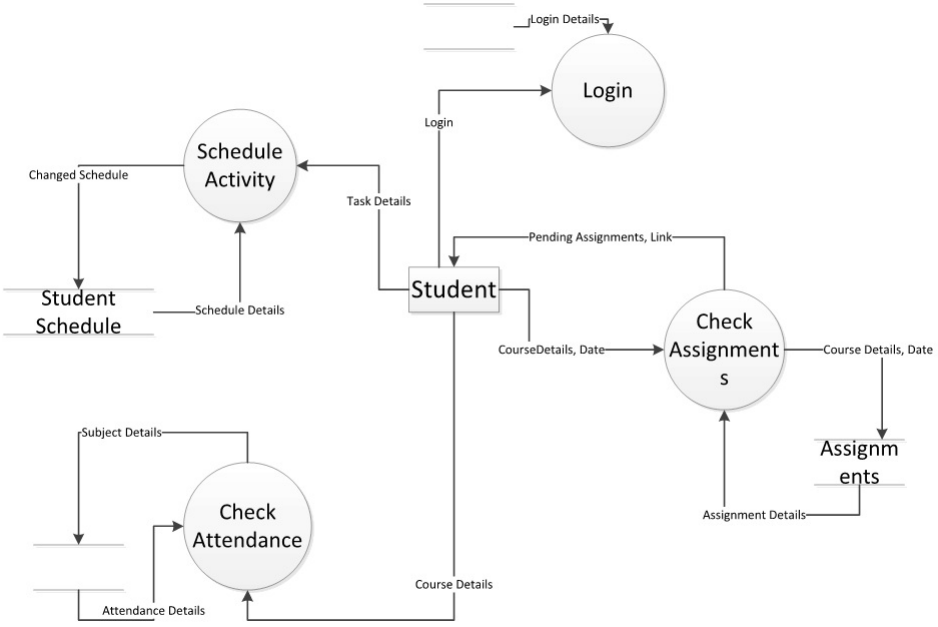


Figure 4.3: DFD Level 1:Student Module

4.1.3 Level 2 Diagram

The Level 2 DFD is the further decomposition of Level 1 processes into sub-processes (sub-systems) which give detailed description of the data flow in each processes. Here we have decomposed the process Give Assignments of the Professor Module [4.4]. The faculty selects the course ID and uploads the new assignment. The data storage used in this level is the Assignments database and Courses database.

4.2 Object Oriented Software Design

In this design approach the system is viewed as a collection of entities (objects). Each object manages its own properties (attributes) and state.

4.2.1 ER Diagram

The entity-relationship diagram is a data modeling technique that graphically represents an information systems entities and the relationships between those entities. An ER diagram is a conceptual and representational model of data which is used to represent the system framework infrastructure.

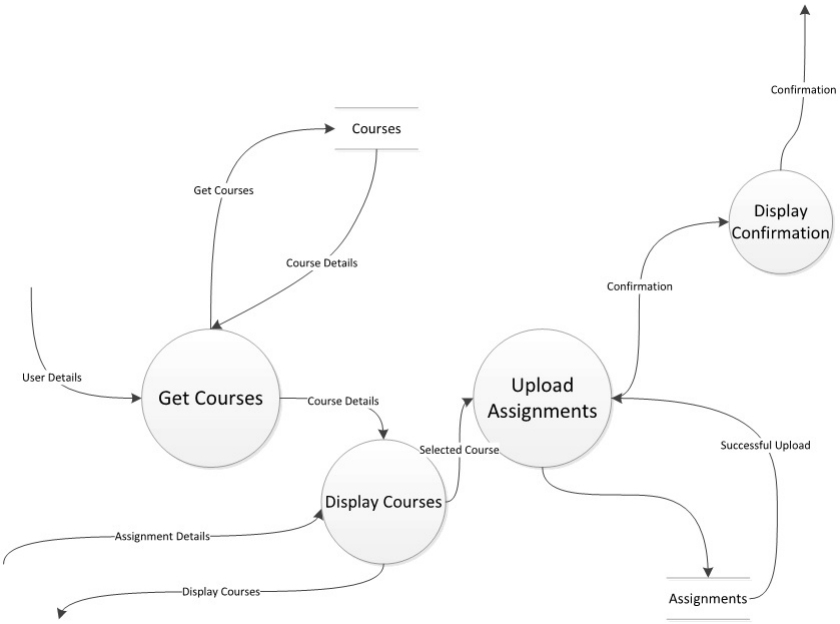


Figure 4.4: DFD Level 2:Give Assignment

- Entities.
- Relations.
- Attributes.

In designing the ER diagram [4.5], we identify and define all the entities, determine the interactions between the entities and determine the cardinality of the relationship. The ER diagram for the automated planning system represents all the entities namely User(Faculty and Student), Courses, Professor Schedule, Student Schedule, Assginments, Attendance and the relationship between these entities used in the system.

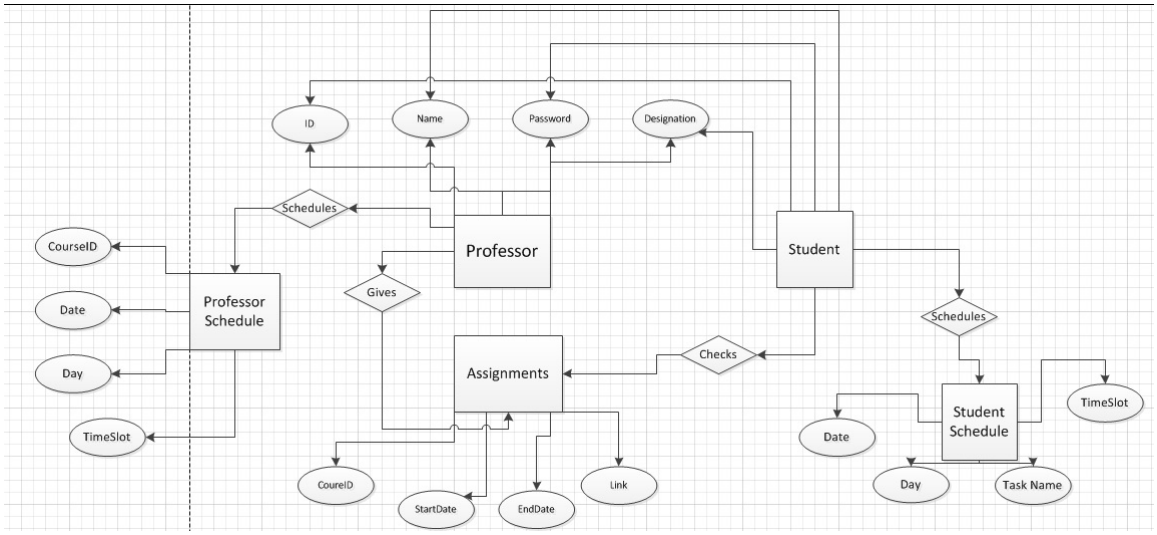


Figure 4.5: ER Diagram

Chapter 5

UML Modelling

UML, as the name shows, is a modelling language. It is used to specify, draw, visualize and document the parts of the software.
It provides a set of notations (such as rectangles, ellipses, lines etc.) to create the visual model of a system. This phase is used to design different UML diagrams corresponding to the application development.[1]

5.1 Use Case Diagram

Use case diagrams are the diagrammatic representation depicting users interactions with the system. This diagram shows different types of users and various ways in which these users interact with the system.

Figure 5.1 shows the use case diagram for an user(faculty or student).It shows all the different possible ways in which an user can use the automated planning system.Every faculty can use the system through their personal computer to take the schedule classes,give assignments or check the schedule and pending assignments if it is a student.The faculty after logging into the system can view the previous schedule, and replan the schedules.He can then give assignments. The students can check for attendance and also plan their daily schedule or check for new assignments.

Figure 5.2 shows the detailed use case diagram which shows the intermediate processes which the top level function uses.

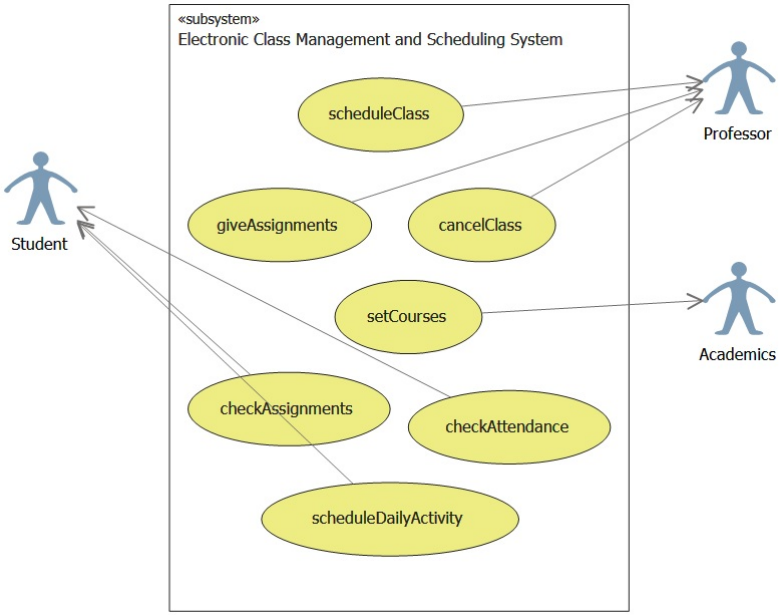


Figure 5.1: Use Case Diagram

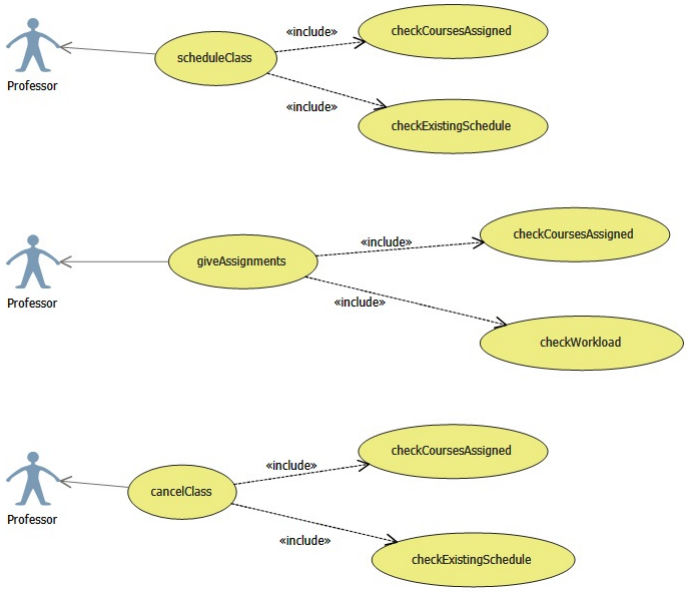


Figure 5.2: Detailed Use Case Diagram

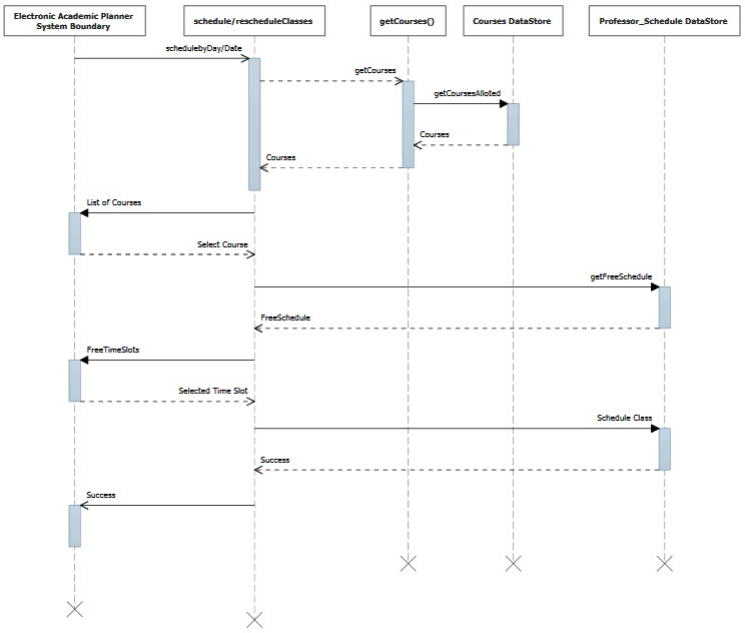


Figure 5.3: Sequence Diagram of Schedule/Reschedule Classes

5.2 Sequence Diagram

Sequence diagram is an interaction diagram which shows how the processes interact with one another and in what order. It shows the object interactions arranged in time sequence. It represent the objects and classes involved in the scenario. It also shows the sequence of messages exchanged between those objects which is needed to perform different functionality of the scenario. Sequence diagrams are associated with use case realizations of the Logical View of the system.

Figure 5.3 shows the sequence diagram of the "Schedule or Reschedule Classes" function of the professor module

Figure 5.4 shows the sequence diagram of the "Give Assignment" function of the professor module.

5.3 Activity Diagram

Activity diagram is a graphical representation of the workflow and the sequence of activities used to describe the functioning of the system. This diagram shows the overall

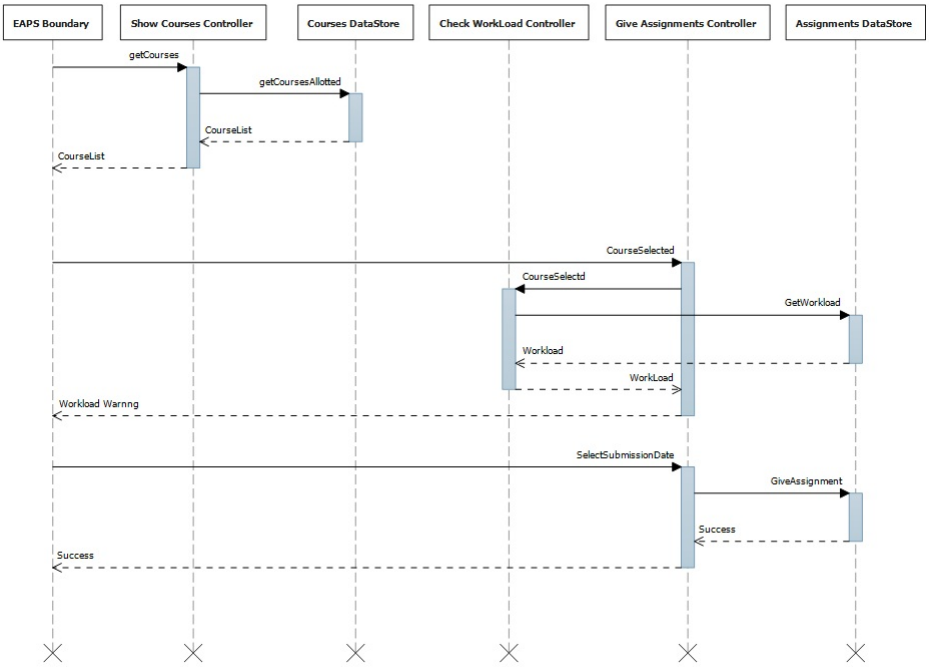


Figure 5.4: Sequence Diagram of Give Assignments

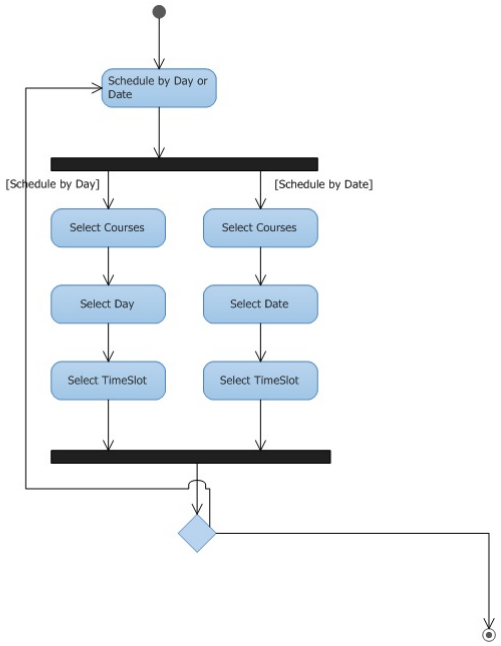


Figure 5.5: Activity Diagram of Schedule Classes

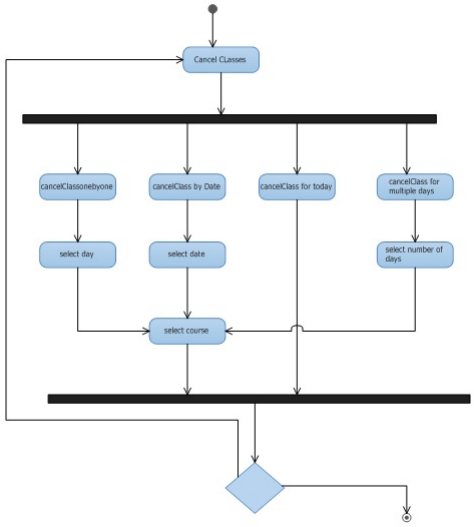


Figure 5.6: Activity Diagram of Cancel Classes

control flow of the system.

Figure **??** shows the activity diagram of the Schedule Classes functionality of the system.

Figure **??** shows the activity diagram of the Cancel Classes section of the system.

Figure **??** shows the activity diagram of the Give Assignments section of the system.

5.4 Class Diagram

Class diagram is a type of static structure diagram which describes the structure of a system by representing the classes of the system, their attributes, operations and the relationships among these classes.

The figure 5.8 represents the class diagram for the automated planing system. In this system, we have six classes namely Professor, Student,Course list, Professor Schedule, Student Schedule, Assignments and attendance.Some of the common classes aren't shown.The class Faculty can get the Course List which is allotted to him,get the existing class schedule from the Professor Schedule and modify his class schedule.The class Faculty has many-to-many relationship with class Course List and one-to-one relationship with class Professor Schedule.The class Course List contains the details of the Course and has one-to-many with the class Student.The class Student has many-to-many relationship

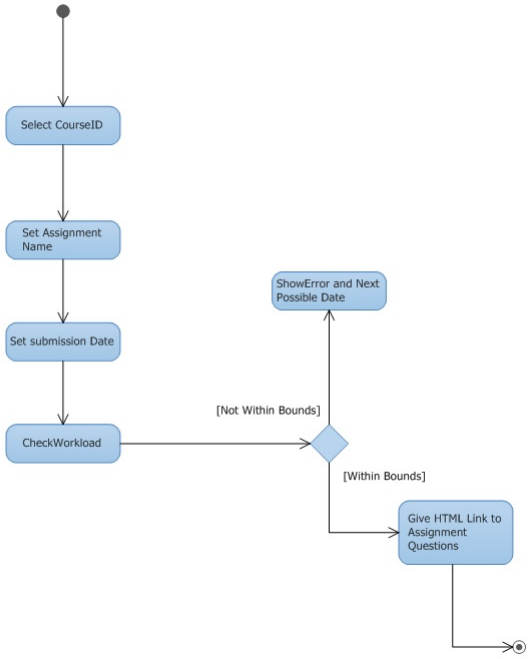


Figure 5.7: Activity Diagram of Give Assignments

with the class Assignments.

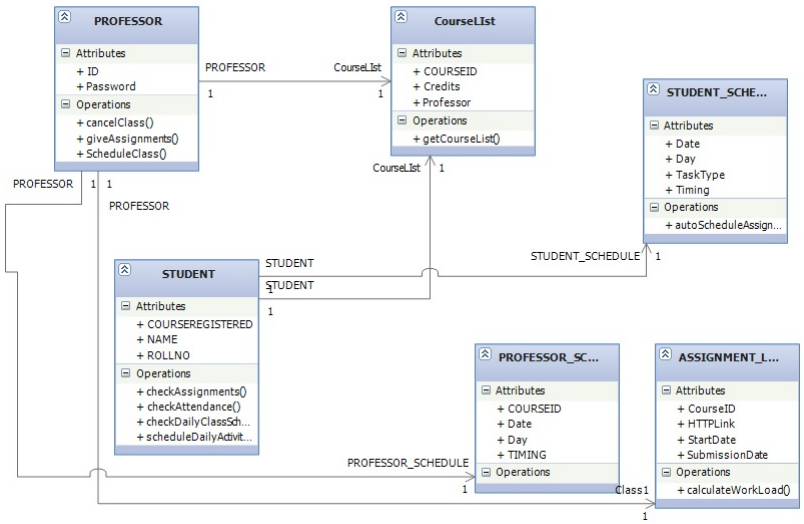


Figure 5.8: Class Diagram

Chapter 6

Implementation

The Application is implemented according to three tier architecture. Three tier architecture ,figure 6.1 is commonly known as Client-Server architecture, where Client is the consumer of the services, also the requester of services where as the server side is the provider of services. The third layer that is the middle layer that converts the users requests into server understandable form.

The system developed contains a Windows Form Application as its front end i.e the client side. The middle layer that connects the client side to the server side is ADO.NET that is primarily used to transmit data between server and server application.

The server side consists of SQL Server 2008. The application uses C# to connect to the database.

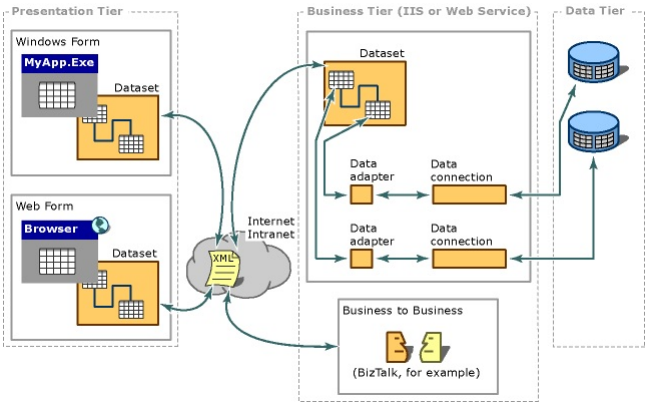
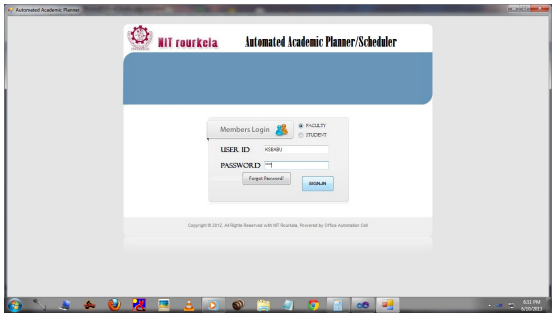


Figure 6.1: 3-Tier Structure

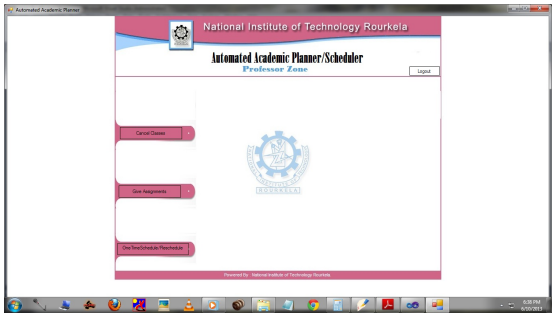
Chapter 7

Graphical User Interface

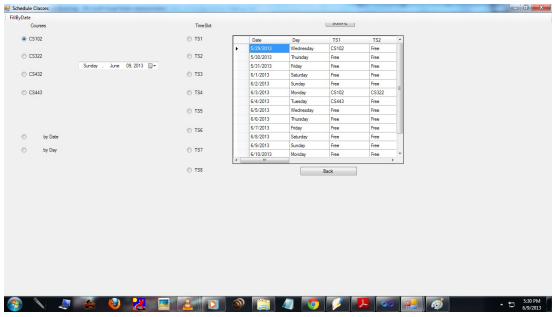
The application GUI is developed using Visual C# for windows form applications and the various forms are as shown below.



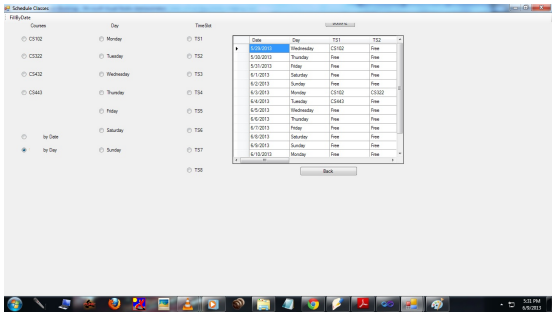
(a) Login Page



(b) Professor Module Screen

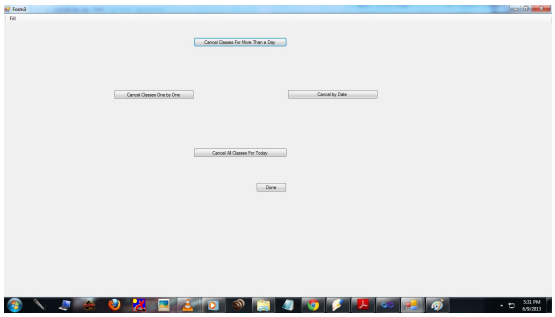


(a) Schedule by Date Screen

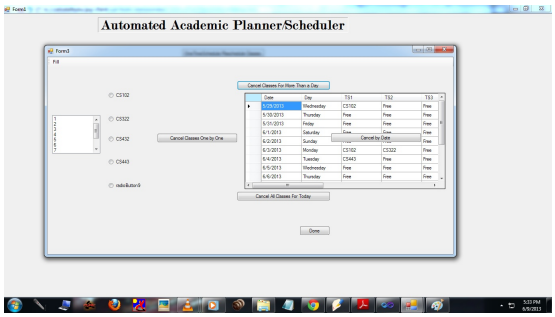


(b) Schedule by Day Screen

Figure 7.2: The Schedule Classes Form



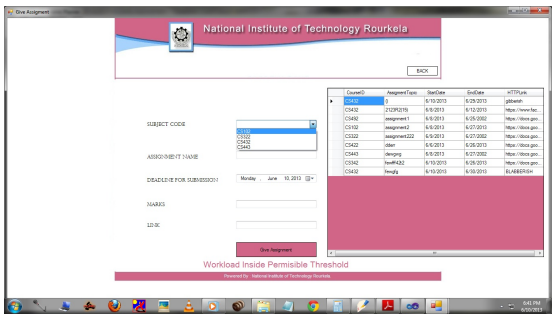
(a) Cancel Class Module



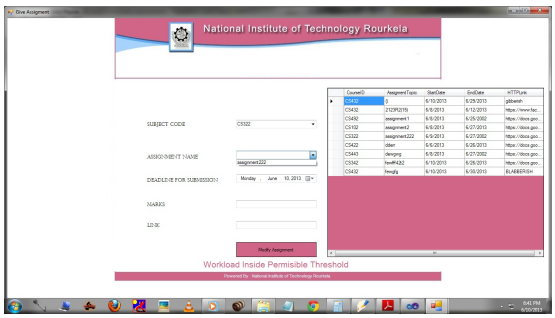
(b) Cancel Class Module with different options

Figure 7.3: The Cancel Class Form

Figure 7.4: The Give Assignments Main

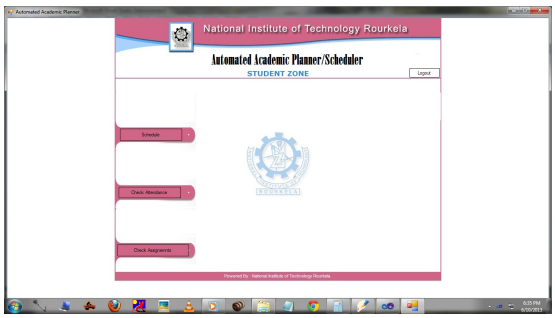


(a) The Give New Assignments page

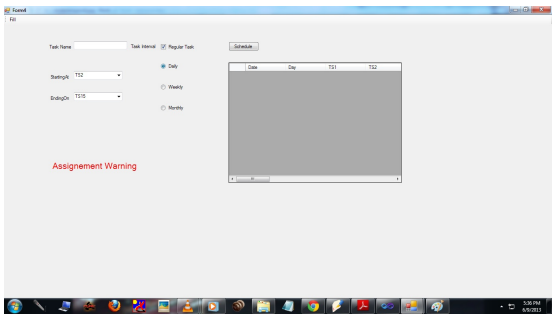


(b) Modify Assignments page

Figure 7.5: The Give Assignment Form

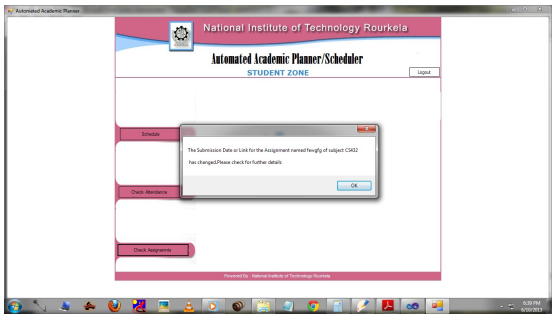


(a) Student Screen showing the various options

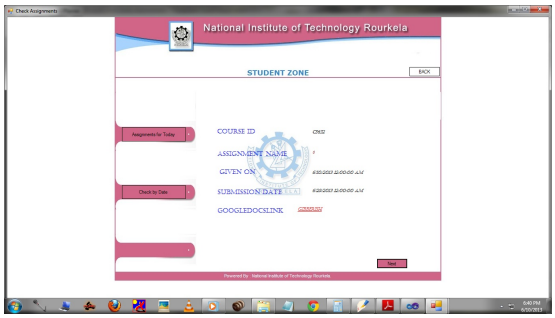


(b) Schedule Activity Module

Figure 7.6: Student Main Screen



(a) Check Assignments page showing warning about changed assignments



(b) Check Assignments with Options

Figure 7.7: Check Assignments Main Screen

Chapter 8

Conclusions and Future Work

8.1 Conclusion

Design and Implementation on a larger scale will alleviate all problems in the random change of classes and will lead to lesser rate of missing classes.
The system also will alleviate the problems associated with misinformation regarding assignments, and will lead to better and faster rates of assignment submission.
The system will be completely automated and the error rates will significantly decrease Since the system is more intuitive and user friendly than other available system and is available for free, deployment and training cost will be almost zero.

8.2 Future Work

The Check Attendance module couldn't be implemented because of time and technology constraints. The system couldn't be synchronised with the central attendance database leading to the failure of implementation. This is one of the major field for future work, i.e, to completely sync it with the central databases.
Further additional functionalities like direction submission of assignments from the system can be incorporated.The GUI can be made into an interactive one.
Also, implementing the system for mobile operating systems like Android and Windows Phone OS can significantly increase the value of the system making it easier to access.

Bibliography

[1] Rajib Mall. *Fundamentals of Software Engineering*. PHI Learning Pvt. Ltd, 2009.

[2] Anne Boehm and Joel Murach. *ASP.Net 3.5 Web Programming with C# 2008*. Mike Murach and Associates, 2008.

[3] Bart De Smet. *C# 4.0 Unleashed*. SAMS Publishing, 2011.

[4] Nancy Greenberg Salome Clement, Chaitanya Koratamaddi. *Oracle Database 10g : SQL Fundamentals, Student Guide*. Oracle Corporation, 2009.

[5] W3 Schools. Sql queries. `http:\\www.w3schools.com`.

[6] Microsoft. Visual c# resources. `http://msdn.microsoft.com/en-US/`.

[7] Microsoft Support. Visual c# resources. `http://support.microsoft.com/`.

[8] Stack Overflow. Visual c# programming guide. `http://www.stackoverflow.com/`.

[9] The Code Project. C# the code project, free tutorials. `http://www.codeproject.com/KB/cs/`.